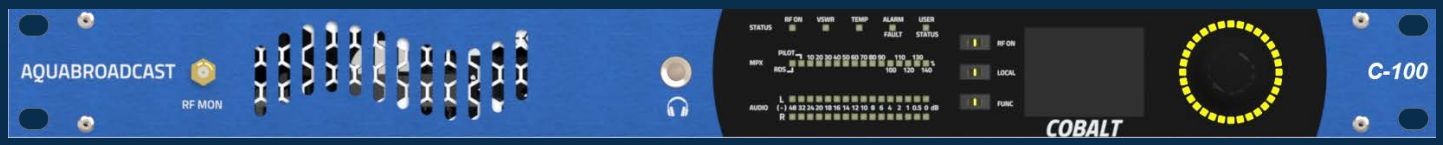
COBALT



Fully Featured FM Transmitter Installation Guide and User Manual
Version 1.0.2

THANK YOU

Creating the Most Exciting and Engaging FM Broadcast experience possible...

We're grateful that you have chosen an Aqua Broadcast FM Transmitter. We hope that you enjoy your Aqua Broadcast product for many years to come.

Everyone here at Aqua Broadcast is passionate about developing new and innovative products. By shaping the future of FM Broadcast by delivering innovative, intuitive solutions that inspire our customers to create the most exciting and engaging content possible.

From everyone at Aqua Broadcast.

ABOUT COBALT

The COBALT Series of FM Transmitters has been designed with future Broadcast in mind. Utilizing the latest DDS (Direct to Digital Synthesis) Modulation, giving you the cleanest and most stable signal out there.

This user manual covers the entire COBALT range, the user settings and controls are the same regardless of the power, so if you can use one you can use them all!

All COBALT Transmitters have the following standard features,

- **DDS FM Exciter**
- **Dynamic, UECP Compliant RDS Encoder**
- **Digital MPX with MPX power Limiter**
- **GPS Sync**
- **ITU-R BS 412.9 Limiter**
- **4 Band Audio Processor**
- **Linux OS**
- **RGB Screen**
- **Ethernet Control**
- **SNMP**

User Warnings and Cautions	4
Safety Information	5
Operating Environment	5
Installation	5
Operation	6
Repair and Service	6
Detailed Safety Instructions	7
Product Disposal and Hazards	8
Warranty	9
Front and Rear Images	10
Pinouts	11
User Input Experience	12
Home Screen	13
Radio Screen	13
Inputs Screen	14
Audio Processor	15
Audio Processor Presets	16 & 17
RDS	18
Exciter and Stereo Encoder	19
Outputs	21
System and Network	22
Web Interface	23
Dashboard	24
Radio Frequency Screen	25
Inputs Screen	25
Audio Processor Screen	26
RDS Screen	27
Exciter and Stereo Screen	29
Outputs Screen	31
SFN Sync Screen	32
System Screen	33
Services	33
Network	33
LOGS	34
Specifications	35 & 36
Contact Information	37

The installation and service instructions in this manual are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Refer all servicing to qualified personnel

This product has an auto-ranging line voltage input. Ensure the power voltage is within the specified range stated on the rear of the unit.

CAUTION: HAZARDOUS VOLTAGES

This paragraph concerns safety instruction related to all Aqua Broadcast Transmitter products in general.

Aqua Broadcast makes every effort to keep the safety standards of our products up to date and to offer our customers the highest possible degree of safety. Our products and the auxiliary equipment they require are designed, built and tested in accordance with the safety standards that apply in each case. Compliance with these standards is continuously monitored by our quality assurance system.

Aqua Broadcast products are compliant with safety rules for broadcasting transmitter as defined by IEC / EN 60215 and its amendment. According to this standard only skilled person are allowed to operate on Aqua Broadcast devices IEC / EN 60215 and its amendment defines the minimum requirements for skilled electrical personnel.

The compliance with this standard is a pre-condition for operating with Radio Broadcasting equipment. The operator or the operator's authorized representative is responsible for ensuring compliance with these guidelines. They are also responsible to achieve necessary authorization by site owner or according to local laws to operate hereunder. They must also ensure that the operating personnel meets the applicable country-specific training requirements. These requirements also may include any periodic training that is necessary.

The products described here have been designed, manufactured and tested according the relevant standards and directive, see EC/ EU declaration of conformity attached to this manual. The products described here have left the manufacturers facilities fully compliant with safety standards. To maintain this condition and to ensure safe operation, you must observe all instructions and warnings provided in this manual. For any clarification on it, for any doubt or any suggestion please directly contact Aqua Broadcast at support@aquabroadcast.co.uk

Furthermore it is your responsibility to operate the device in an appropriate manner. This product is designed to work in telecommunications centers only, except when expressly authorized, and must not be used in any way that may cause injury to persons or goods. In case the product is used for any intention other than its designated purpose or in disregard of its instructions you, the operator, are the sole responsible for any damage that this un-proper operation may cause.

The product is used properly when it is used in accordance with its instructions and under its operating conditions and its performance limits (refer to product manual, modules, manuals and products or modules datasheets). This condition may only be assumed by a skilled person with a basic knowledge of English (since all symbols, labels and message displayed are referred to in this language).

Skilled people also have to check if particular requirements or special equipment or tools are required depending on the product or the environment and to follow all instructions to use any additional special equipment.

The Product manual, and in particular safety instructions should be kept near the product in a safe place, in order to be available for all skilled personnel who operate the device. Observing the safety instructions will help prevent personal injury or damage to goods caused by dangerous situations. Therefore, carefully read through and adhere to the following safety instructions before and when using the product. It is also absolutely essential to observe the additional safety instructions on personal safety, for example, that appear in relevant parts of the product documentation or that are given on the operating site.

CHECK ALL ELECTRICAL CONNECTIONS ARE CORRECT AND SAFE BEFORE POWERING ON THE TRANSMITTER

The product may be operated only under the operating conditions and in the positions specified by the manufacturer, without any obstruction in product's ventilation. If the manufacturer's specifications are not observed, this can result in electric shock, fire and/or serious personal injury or death. Applicable local or national safety regulations and rules for the prevention of accidents must be observed in all cases. Unless otherwise specified, the following environmental requirements apply to Aqua Broadcast products: Use only indoors, the maximum operating altitude 3000 m above sea level, maximum transport altitude 6000 m above sea level. A tolerance of ±15 % shall apply to the nominal voltage and ±5 % to the nominal frequency. Do not place the product on surfaces, cabinets, or tables that for reasons of weight or stability are unsuitable for this purpose.

Always follow the manufacturer's installation instructions when installing the product and fastening it to objects or structures (e.g. walls and shelves). An installation that is not carried out as described in the product documentation could result in personal injury or death. Do not place the product on heat-generating devices such as radiators or fan heaters. The ambient temperature must not exceed the maximum temperature specified in the product documentation or in the data sheet. Product overheating can cause electric shock, fire and/or serious personal injury or death Do not install, operate, maintain the device if you are physically or mentally stressed.

INSTALLATION

If the information on electrical safety is not observed there is a possibility that electric shock, fire and/or serious personal injury or death may occur.

Prior to switching on the product, always ensure that the product nominal voltage setting matches with the nominal voltage of the AC supply network. If there is a mismatch do not connect the product to the power network until the mismatch is resolved. If a different voltage is to be set, the power fuse of the product may have to be changed accordingly.

In the case of products of safety Class 1 with a removable power cord and connector, operation is permitted only on sockets with an earth contact and protective earth connection.

Intentionally breaking the protective earth connection either in the feed line or in the product itself is not permitted. Doing so can result in the danger of an electric shock from the product. If extension cords or connector strips are implemented, they must be checked on a regular basis to ensure that they are safe to use.

If the product does not have a power switch for disconnection from the AC supply network, the plug of the connecting cable must be considered as the disconnecting device. In this case, always ensure that the power plug is always easily reachable and accessible. Ensure also that the plug-in connection is secure, bad connections may cause damage to the equipment and may be unsafe. Functional or electronic switches are not suitable for providing disconnection from the AC supply network. If products without power switches are integrated into racks or systems, a disconnecting device must be provided at the system level is site main electrical switchboard.

Never use the product if the power cable is damaged. Check the power cable on a regular basis to ensure that it is in proper operating condition. Check the power cable is suitable for the power ratings of the device by taking appropriate safety measures and carefully laying the power cable, you must ensure that the cable will not be damaged and that no one can be hurt by. Tripping over the cable or suffering an electric shock.

The product may be operated only from TN/TT supply networks.

Do not insert the plug into sockets that are dusty or dirty. Insert the plug firmly and all the way into the socket. Otherwise, sparks could result in fire and/or injuries may occur.

For measurements in circuits with voltages Vrms > 30 V, suitable precautions (e.g. appropriate measuring equipment, fusing, current limiting, electrical separation, insulation) should be taken to avoid any hazards.

Ensure that the connections with information technology equipment, e.g. PCs or other industrial computers, comply with the IEC60950-1/EN60950-1 or IEC61010-1/EN 61010-1 standards that apply in each case.

Unless expressly permitted, never remove the cover or any part of the housing while the product is in operation. Doing so will expose circuits and components and can lead to injuries, electrical shock, fire, or damage to the product.

Aqua Broadcast products are designed to be permanently installed, so the connection between the PE terminal on site and the product's PE conductor must be made first before any other connection is made.

Permanently installed equipment must have either built-in fuses, circuit breakers or similar protective devices, moreover the supply circuit must be fused in such a way that anyone who has access to the product, as well as the product itself, is adequately protected from injury or damage.

Use suitable overvoltage protection to ensure that no overvoltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the person operating the product will be exposed to the danger of an electric shock.

Products are normally designed to operate in an indoor environment (IP 20 typically) no liquid protection is therefore given, the equipment must be protected from all liquids. If the necessary precautions are not taken, the user may suffer electric shock or the product itself may be damaged, which can also lead to personal injury.

Never use the product under conditions in which condensation has formed or can form in or on the product, e.g., if the product has been moved from a cold to a warm environment. Penetration by water increases the risk of electric shock.

Prior to cleaning the product, disconnect it completely from the power supply (e.g., AC supply network or battery). Use a soft, non-lining cloth to clean the product. Never use chemical aggressive cleaning agents such as alcohol, acid, acetone, or diluents for cellulose lacquers.

OPERATION

Operating the equipment requires trained and skilled personnel. It requires also intense concentration. Make sure that people who operates is physically, intellectually, and mentally fit to do so. Physical or mental stress may cause a fall in concentration, and this may cause injury or material damage.

Before you install, connect, operate, disconnect, or dismount the equipment, read the relative safety instructions.

In case of fire, some hazardous substances may be released by the unit, such as gas or fluids. This can cause health problems. So, in this case necessary measures must be taken, such as protective masks, gloves, clothing and so on should be used.

REPAIR AND SERVICE

Special training is required to open and repair Aqua Broadcast devices. Before removing the lid and before opening it, the AC mains must be switched off and disconnected and then wait at least 30 seconds for the discharge of energy of any capacitors. Otherwise, there could be a risk of electrical shock.

It is strongly recommended to send faulty devices / modules to the factory for repair, if feasible. Otherwise only when authorized by Aqua Broadcast, trained personnel may perform repairs. All repairs require only original spare parts to be used. After repair a safety test is recommended (visual inspection, electrical test, insulation test, ground continuity test, leakage current measurement, functional test and so on) This helps to assure the continued safety of the device.

If products or their components are mechanically and/or thermally processed in a manner that goes beyond their intended use, hazardous substances (heavy-metal dust such as lead, beryllium, nickel) may be released. For this reason, the product may only be disassembled by specially trained personnel. Improper disassembly may be hazardous to your health. National waste disposal regulations must be observed. The improper disposal of hazardous substances or fuels can cause health problems and lead to environmental damage.

All the safety and operation instructions should be read before the unit is operated.

Retain Instructions: The safety and operating instructions should be retained for future reference.
All warnings on the unit and in the operating instructions should be adhered to.

Follow instructions: All operation and user instructions should be followed.

Water and Moisture: The unit should not be used near water. The unit should not be exposed to dripping or splashing and objects filled with liquids should not be placed on or within close proximity of the Transmitter.

Ventilation: The unit should be situated so that its location or position does not interfere with its proper ventilation. For example, the unit should not be situated on a surface that may block the ventilation openings, or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

Grounding or Polarisation: Precautions should be taken so that the grounding or polarisation method of the unit is not defeated or compromised.

Power-Cord Protection: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles and the point where they exit from the unit.

Cleaning: The unit should be cleaned only as recommended by the manufacturer. Wash your hands after any cleaning.

Non-use Periods: The power cord of the unit should be unplugged from the outlet when left unused for a long period of time.

Object and Liquid Entry: Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

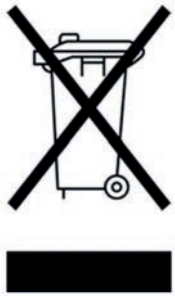
Damage Requiring Service: The unit should be checked and serviced by qualified service personnel when:

- The power supply cord or the plug has been damaged
- Objects have fallen, or liquid has been spilled into the appliance
- The appliance has been exposed to rain
- The appliance does not appear to operate normally or exhibits a marked change in performance
- The appliance has been dropped, or the enclosure damaged

During product disposal the following directives must be adhered to:

• 2002/96/EC on waste electrical and electronic equipment (WEEE),

• 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).



Once a product is at the end of its lifetime, the product must not to be disposed of in standard domestic civil refuse. Even disposal of on municipal collection points for waste electrical electronic device is not allowed. It has to be treated as electronic waste.

Hazards due to Beryllium Oxide / Beryllium Copper (BeO)

In case the apparatus contains components are using Beryllium Oxide / Beryllium Copper, these shall be labelled with special symbols.

• DANGER! Beryllium Oxide / Beryllium Copper is dangerous when inhaled, ingested or in contact with the skin, especially if cut or scratched. After handling products containing Beryllium Oxide / Beryllium Copper, wash your hands immediately.

• If handled correctly, parts or components containing Beryllium Oxide / Beryllium Copper are not hazardous to health. If used improperly, however, Beryllium Oxide / Beryllium Copper dust may be released. Beryllium Oxide / Beryllium Copper dust causes chronic disease (berylliosis); inhaling large amounts over an extended period of time is toxic, causing respiratory paralysis and death.

Rules for Handling Beryllium Oxide / Beryllium Copper:

- Parts or components containing Beryllium Oxide / Beryllium Copper ceramics must not be opened, mechanically processed, or destroyed.
- Above all, these parts or components must not be scratched, broken, ground, tempered and sandblasted, not even under exhaust hoods.
- In the transmitter, all components containing parts made from Beryllium Oxide / Beryllium Copper are marked with a warning symbols and a labels.

DANGER! Beryllium Oxide / Beryllium Copper

Please ensure the warranty registration process is completed upon receipt of this product.

To do so, go to www.aquabroadcast.co.uk/support with your product's serial number to hand. Aqua Broadcast warrants the mechanical and electronic components of this product to be free of defects in material and workmanship for a period of up to Two years from the original date of purchase, in accordance with the warranty regulations described below. If the product shows any defects within the specified limited warranty period that are not due to normal wear and tear and/or improper handling by the user, Aqua Broadcast shall, at its sole discretion, either repair or replace the product. If the warranty claim proves to be justified, the product will be returned to the user. The return freight for any Warranty repair or claim will be paid by Aqua Broadcast during the 2-year Warranty, thereafter freight will be the responsibility of the customer. Warranty claims other than those indicated above are expressly excluded.

Note: The warranty registration process must be carried out as described above to enable warranty cover.

Return authorisation number: To obtain warranty service, the buyer (or his authorised dealer) must contact Aqua Broadcast during normal business hours BEFORE returning the product. All inquiries must be accompanied by a description of the problem. Aqua Broadcast will then issue a return authorisation number. Subsequently, the product must be returned in its original shipping carton, together with the return authorisation number to the address indicated by Aqua Broadcast.

Warranty regulations: Any product deemed eligible for repair or replacement by Aqua Broadcast under the terms of this warranty will be repaired or replaced within 30 days of receipt of the product at Aqua Broadcast. If the product needs to be modified or adapted to comply with applicable technical or safety standards on a national or local level, in any country which is not the country for which the product was originally developed and manufactured, this modification/adaptation shall not be considered a defect in materials or workmanship. The warranty does not cover any such modification/adaptation, irrespective of whether it was carried out properly or not. Under the terms of this warranty, Aqua Broadcast shall not be held responsible for any cost resulting from such a modification/adaptation. Free inspections and maintenance/repair work are expressly excluded from this warranty if caused by improper handling of the product by the user. This also applies to defects caused by normal wear and tear of potentiometers, keys/buttons, and similar parts. Damages/defects caused by the following conditions are not covered by this warranty: Misuse, neglect, or failure to operate the unit in compliance with the instructions given in Aqua Broadcast user or service manuals. Connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used. Damages/defects caused by force majeure or any other condition that is beyond the control of Aqua Broadcast. Any repair or opening of the unit carried out by unauthorized personnel (user included) will void the warranty. If an inspection of the product by Aqua Broadcast shows that the defect in question is not covered by the warranty, the inspection costs are payable by the customer. Products that do not meet the terms of this warranty will be repaired exclusively at the buyer's expense. Aqua Broadcast will inform the buyer of any such circumstance.

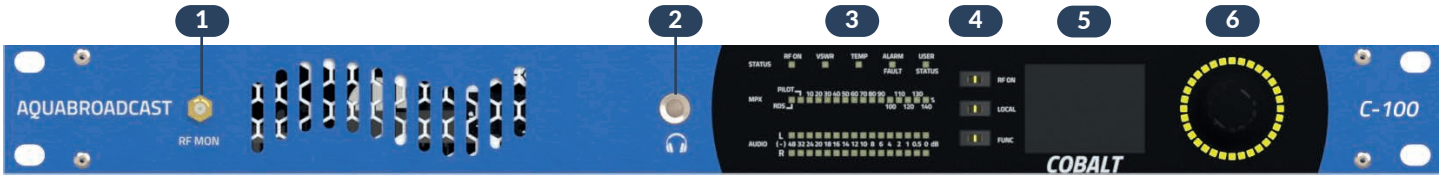
Warranty transferability: This warranty is extended exclusively to the original buyer (customer of the retail dealer) and is not transferable to anyone who may subsequently purchase this product. No other person (retail dealer, etc.) shall be entitled to give any warranty promises on behalf of Aqua Broadcast.

Claims for damages: Failure of Aqua Broadcast to provide proper warranty service shall not entitle the buyer to claim (consequential) damages. In no event shall the liability of Aqua Broadcast exceed the invoiced value of the product.

Other warranty rights and national law: This warranty does not exclude or limit the buyer's statutory rights provided by national law any such rights against the seller that arise from a legally effective purchase contract. The warranty regulations mentioned herein are applicable unless they constitute an infringement of national warranty law

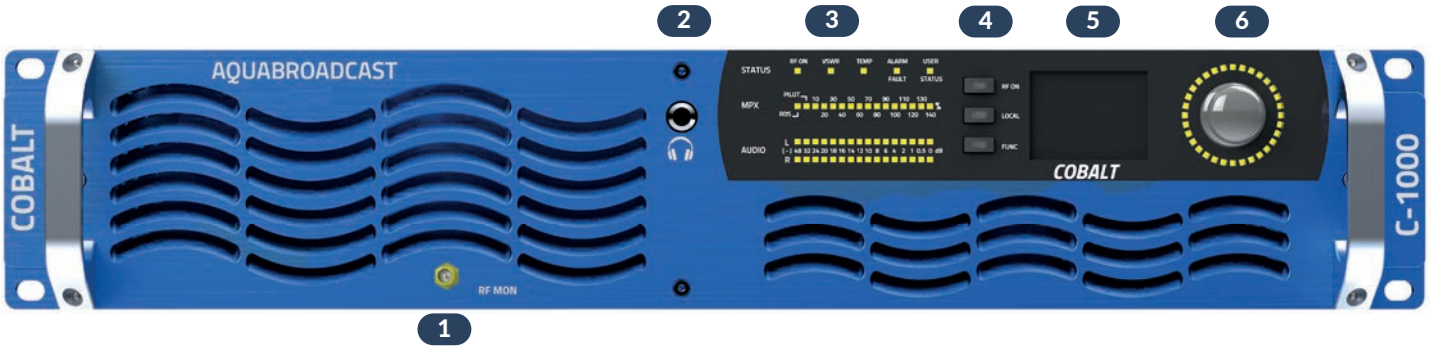
FRONT AND REAR IMAGES

The following Cobalt models all share the same front and rear panels C-30, C-50, C-100



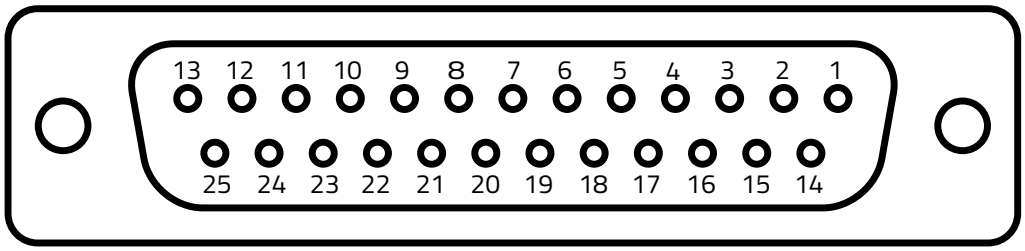
1. RF Monitor Port
2. Headphones
3. Meters
4. Quick Buttons
5. RGB Screen
6. Joystick
7. LAN 2 and USB
8. Digital Audio In and RDS Data
9. MPX 1 & 2 Inputs and Outputs
10. LAN 2
11. RS232 and GPIO
12. GPS Sync Inputs
13. Analogue Inputs
14. RF Out
15. Optional 24/48V DC Input

The following Cobalt models all share the same front and rear panels C-300, C-600, C-1000



1. RF Monitor Port
2. Headphones
3. Meters
4. Quick Buttons
5. RGB Screen
6. Joystick
7. LAN 1 and USB
8. RS232 and GPIO
9. GPS Sync Inputs
10. Digital Audio In and RDS Data
11. MPX 1 & 2 Inputs and Outputs
12. Analogue Inputs
13. RF Out
14. LAN 2
15. Optional External Fan Connection
16. Optional 2nd PSU AC Input

The DB25 connector on the Cobalt range have the same Pinouts, regardless of the model or power output.



D-SUB 25 female connector

PIN NUMBER	SIGNAL COMMAND
1	GP OUT
2	GP OUT
3	GP OUT
4	GP OUT
5	GP IN
6	GP IN
7	GP IN
8	GP IN
9	ANALOG OUT (330Ohm, 0-5 V)
10	ANALOG OUT (330Ohm, 0-5 V)
11	UART (RS232 CONVERTER)
12	5V (SPARE POWER)
13	INTERLOCK
14	GP OUT
15	GP OUT
16	GP OUT
17	GP OUT
18	GP IN
19	GP IN
20	GP IN
21	GP IN
22	ANALOG OUT (330 Ohm, 0-5 V)
23	ANALOG OUT (330 Ohm, 0-5 V)
24	UART (RS232 CONVERTER)
25	GND

The Cobalt series features a clickable joystick as the main input interface so you can move and click with just one hand. The incorporated haptics compliment the visual information with tactile feedback for a complete experience. The analogue capabilities of the joystick are put to good use during parameter editing, where you can tilt the joystick further to accelerate value changes. Change the values more slowly by tilting the joystick less or just tap it shortly for precise small step value changes.

The navigation through the menus occurs at two levels.

- On the first level you can quickly browse through the different screens:

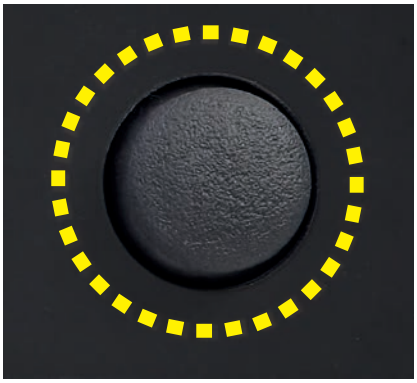
The main menu categories are connected as a ring, on the left/right direction, but there might be related screens hanging up or down. On each screen, BLUE labels on its sides show the available navigation directions.

- On the second level you can navigate inside a particular screen:

Once you have reached the screen where the parameter you want to change is, hit the button once to enter that screen. You can now move through the parameters in that page.

Move to that parameter and click to start editing that parameter. Use the joystick to change the value and then click to accept or double click to cancel (revert to the previous value). Double click again to go back to screen navigation.

When editing a parameter, the LED ring shows the value of the parameter with respect to the parameter range.

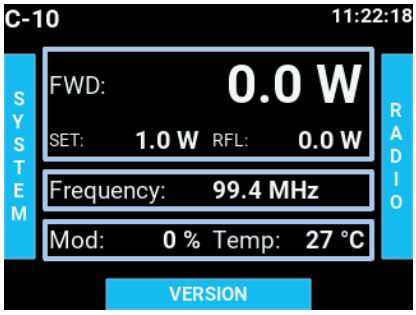


Enter and exit menu navigation

- To select one screen: click
- To resume screen navigation: double click.

Enter and exit menu navigation

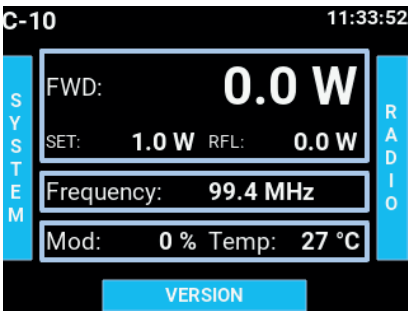
- Move through the menus until reaching the relevant screen.
- Press the joystick once to enter that category.
- Use the joystick to navigate to the desired parameter
- Click once to start editing the selected parameter.
- Move the joystick to edit the parameter value/option. Tilt the joystick further to change the value faster.
- If you want to save the new value, click the joystick. Double click will revert the value to the previous one. This will also deselect the parameter and also exit the parameter editing mode.
- Double click to deselect the parameter and return to navigation inside the screen.
- Double click to exit to menu navigation.



The Home screen on the front of all Cobalt products is equivalent to the dashboard used in the webremote, showing the most important details on the units' operation.

The top row shows

- Model name
- System Time



The screen also shows RF power, Frequency, Modulation and PA Temperature

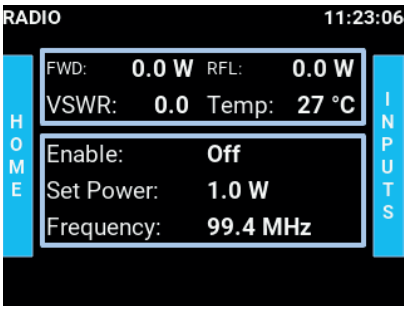
- **FWD:** Shows forward power read from the PA. Press the joystick once to enter that category.
- **SET:** Shows power setting from the Radio menu.
- **RFL:** Shows reflected power reading.
- **Frequency:** Shows frequency setting
- **Mod:** Shows the modulation level in %
- **Temp:** Shows the amplifier temperature read from the PA.

RADIO SCREEN

The Radio screen on the front of all Cobalt products allows for changes and setting of Radio parameters such as Power, Frequency, and Enable (RF On/Off).

The Radio screen shows all the RF current settings within this section.

- **FWD:** Shows the actual forward power reading.
- **RFL:** Shows the actual reflected power reading.
- **VSWR:** Shows the actual calculated VSWR value reading.
- **PA Temp:** Shows the current Amplifier Temperature reading
- **RF Enable:** ON or OFF enables or disables the RF.
- **Set power:** Sets the RF power in Watts that you require.
- **Frequency:** Sets Frequency you require



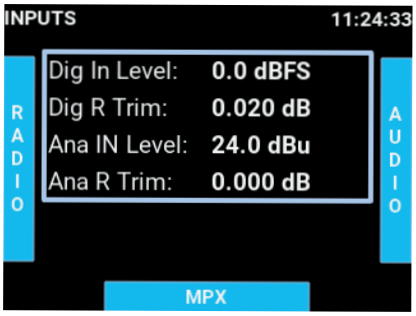
The RFL , VSWR and PA Temp have associated thresholds for protection. When the threshold is reached (excessive RFL or VSWR or too high temperature) the Cobalt protection measures will proportionally decrease the RF power produced to keep the values at safe levels. If excessive VSWR or high PA temperatures occur, the unit will display the associated front panel LED Indicators, and at the same time if set up - will also send any email alerts you may have set up. The front panel LED indicators for ALARM / VSWR / TEMP have the following status conditions;

- **Green -** Shown during normal operation.
- **Yellow -** Caution that the unit is experiencing a condition that could affect normal operation.
- **Red -** the unit is protecting itself under high VSWR conditions.

The Inputs screen shows the current Audio Input settings, and also allows for these parameters to be adjusted to suit your requirement.

The Inputs screen shows the following parameters at a glance.

- Digital In Level
- Digital R Trim
- Analog In Level
- Analog R Trim



Audio Inputs

Both Digital and Analogue Audio inputs are available in the Cobalt Transmitter. Both types of inputs have exactly the same parameters available.

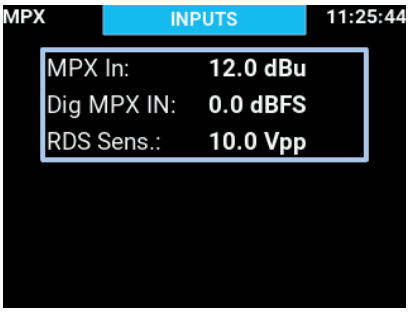
Digital In Level / Analogue In Level

The digital In Level setting ranges from -20dBFS to 0dBFS. The Analogue range is from 0dBu to 24dBu. The step size of both is 0.1dB.

Digital/Analogue Right Trim

This allows you adjust the gain of just one channel of the incoming audio signal. The trim range is +-0.5dB. The step size should is 0.001dB.

MPX Inputs



The Cobalt has two analogue and one digital MPX inputs. The two analogue MPX Inputs are on BNC Connectors. Input 1 one is dedicated as an Analogue MPX input. Input 2 is for RDS (SCA or AUX)

MPX In Level

The range is 0dBu to 12dBu and step size 0.1dB.

Digital MPX IN

Is used on the combined RJ45 connector in Studio HUB+ standard with digital audio. The range is -20dBFS to 0dBFS with 0.1dB step size.

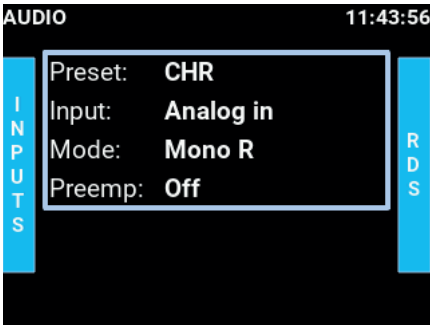
RDS Sensitivity

Let's you adjust for low externally generated RDS signal level coming into the Cobalt.. The range is from 0.1 to 10Vpp with a step size of 0.1Vpp.

The built-in audio processor has 21 presets to choose from, as well as a bypass mode. It allows the user to to select an audio processing preset.

The Audio Processor screen shows the current settings at a glance.

- **Preset** – selects the active audio processing preset
- **Input** – selects the input to the audio processor (Analogue or Digital)
- **Mode** – Channel mode (Stereo, Swap L/ R, Mono L+R, Mono L, Mono R)
- **Preemphasis** - selects the preemphasis setting (OFF, 50us, 75us)



The Audio Processor Presets

The Cobalt Audio Processor presets cannot be adjusted but they are set up and ready to use.

When selecting a preset, always try them with your program music and experiment with different ones as sometimes the name can be misleading based upon your genre. For example, metal music might be derived from rock but won't especially benefit from the rock'n'roll preset. Try CHR, tight or loud instead and you might feel they adjust better. When comparing some preset candidates, bear in mind that their effect in the programme sound won't be immediate due to the time constants in the audio processor. It is very important to use music that you know well to be able to distinguish changes to the sound. If you are still in doubt, CHR works well in most situations

The Bypass Preset

This preset is intended to be used during lab tests, but it could also be used if you have already processed audio and still want to use the internal stereo generator.

If this is the case, you need to make sure that the preemphasis is applied in the external audio processor and set to OFF in the COBALT audio processor.

For safety, the main clippers are still in the chain and working although to facilitate some tests, the main clippers can be defeated when the bypass preset is selected. If you know what you are doing, you can defeat them but it's not at all recommended.

COMPARE

LISTEN TO THE PRESET OVER TIME, AND CHECK AGAIN TO MAKE SURE IT MATCHES YOUR OUTPUT

The following is the list of the available presets as well as a brief description of each, so you can try to choose the one that best suits your station format or personal preferences.

Bypass preset

This preset force gates the AGC's, setting them to unity gain. The limiter and clipper thresholds are raised, and drives are appropriately set so that the peak input and output to the processor match.

AC

Designed for adult contemporary formats primarily, but is also a general, all round preset that can work for many other formats.

bright

Brings the highs out but in moderation. Closer to the clean preset than to the original bright presets.

CHR

If your station requires a sizzling hot presence, bright, in-your-face and standing out of the crowd, this is the preset for you.

Classic/Jazz

A very transparent, high fidelity preset for classical and jazz music, aimed to stay away from affecting the micro dynamics of the music, while providing overall levelling for enjoyable listening.

clean

A preset perfect for music where loudness is not everything. Easy on the clippers to control distortion and reduce listening fatigue. Try acoustic guitar, piano, pop and any easy listening and mellow music.

country

As the name implies, it is targeted to glide across modern and older country music formats (as well as other types of folk music) and bring those guitars, fiddles, and banjos to life.

golden

Designed to bring the best out of those classic tracks that never wear out and shine them back on the dial. From the 60s to 80s, this preset takes advantage of music produced before the digital era.

hot

A nice balance between bass and highs. Competitive but not as aggressive as CHR

indie

From Arctic Monkeys to Franz Ferdinand, but also The Killers and Coldplay... Indie, alternative rock and pop rock music formats should definitely try this preset.

Latin

Created brand new to address the complexity and uniqueness of such a wide and important music genre. Works great with various styles of salsa, mambo, cumbia, bachata, merengue, chan chan and, of course, cha cha cha.

loud

We aimed to create that larger-than-life sound with this preset: loud, yet with sufficient depth and impact, created to push the envelope!

low bass

Heavy on the bass, good for techno.

modern

Music such as reggaeton, modern hip-hop and trap brought style to how music is produced and mastered, and this preset was designed to keep that characteristic sharpness and edginess, rather than squash it down.

original bright

The original bright preset. Much brighter than F9. Try it with trance or dance with vocals.

original bright 2

An alternative to the original bright preset.

rock 'n' roll

For classic rock'n'roll, blues and similar styles.

smooth

Like the clean preset but with a bit more bass.

sports

Clarity of voice, intelligibility, keeping tabs on shouting announcers and keeping your audience right in the centre of that playing field or an important news – that's what this preset does. It can also work on news and talk formats, as an alternative to the existing talk preset.

talk

Optimised for talk radio and intelligibility. Works well for all talk-based formats.

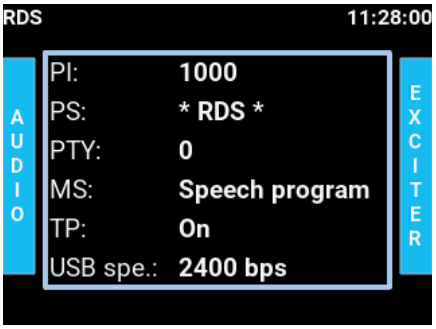
tight

This preset uses some clipping on the bass and lots of limiting in the high end. Extreme metal music might benefit from this presets' tight sound.

urban

It has a fat bass sound but keeps the voice very present. Old school hip hop and RnB are natural choices.

The RDS screen allows you to adjust the basic RDS parameters for static operation from the front panel. The internal RDS encoder full feature set can be accessed via the web remote, including UECP compliant parameters for dynamic RDS.



PI (Program Identifier):

This is a 4-digit hexadecimal number (0-9, then A-F) which is unique to your station normally assigned to you by your local Broadcast regulator or licensing body. It will consist of numbers, an example would be 6C3D.

PS (programme service name):

PS is one of the obligatory settings in RDS. This is the text that will display on a compatible RDS enabled Tuner. It consists of up to 8 characters (spaces are included as a character)

PTY (programme type):

This determines pre-defined programme types (e.g., PTY1 News, PTY6 Drama, PTY11 Rock music) and allows users to find similar programming by genre.

M/S (Music/Speech):

Music/Speech is used to identify if music or speech program is transmitted. The signal supports tuner with two individual volume modes one for music, the other for speech.

TA (Traffic Announcement):

The Traffic Announcement Flag is used to indicate an ongoing traffic announcement. A tune can use the TA flag to Auto-switch to FM tuner if another audio source is selected (CD, etc.) and to automatically adjust audio volume to increase the audio source during a traffic announcement.

USB Port Speed:

Set this according to your USB requirements, by default it's set at 9600 baud.

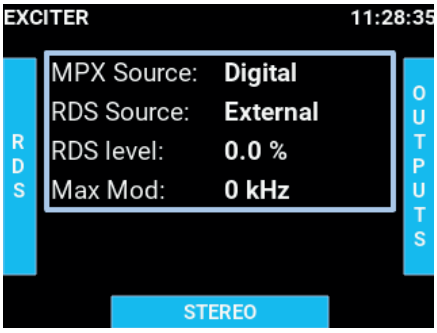
NOTICE

THE INTERNAL RDS ENCODER FULL SET OF FEATURES IS ONLY ACCESSIBLE VIA THE WE INTERFACE

The COBALT offers many possible signal sources and great flexibility in routing and combinating them.

Exciter

The exciter menu selects the source and mix of the signals that will form the multiplex going to the FM exciter and the amount of modulation for the carrier.



MPX Source

This selects the stereo encoded audio signal source and can be sourced externally (analogue or digital MPX inputs) or generated internally in the integrated stereo encoder.

RDS Source

All COBALT units include a very capable RDS encoder and, you can select by switching the RDS source to internal (remember to configure it in the right menu or in the web interface) If you want to use a third party RDS encoder, switch RDS source to external and don't forget to supply the transmitter's pilot to the external encoder to synchronise the RDS subcarrier. Side chain configuration is the only one recommended (otherwise a faulty RDS encoder would compromise the whole transmission). Switch RDS off if you don't want RDS or if the MPX is external and already includes the RDS with it

RDS Level

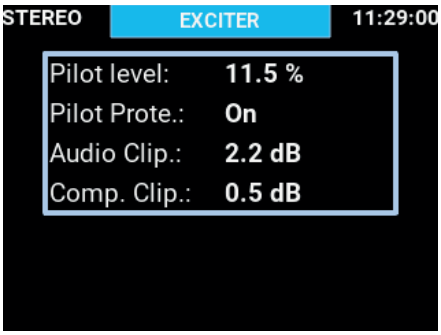
This controls the amount of RDS in the full RDS mix and has a range of 0.0% to 6.0% in 0.1% steps. The Stereo Encoder part will be scaled accordingly so the combined signal doesnt' exceed the selected 100% modulation limit. The stereo encoded signal amplitude will be scaled accordingly so the combined signal doesn't exceed the selected frequency deviation limit. For this to work properly with externally supplied RDS signals, remember to set the RDS input sensitivity to suit your RDS encoder output peak voltage in the inputs menu.

Max Mod

This parameter controls the relationship between the MPX amplitude and the carrier's frequency deviation. In most countries, this should be 75kHz for a full amplitude MPX.

Stereo Encoder

Navigate down to Stereo from the Exciter screen to access these settings and be able to configure some of the internal stereo encoder settings.



Pilot Level

This sets the level of 19kHz pilot tone, which is required for stereo synchronization. The range is 0 to 12% with 0.1% steps.

Pilot Protection

Enables or disables a notch filter in the MPX signal for clean pilot insertion. Excessive amount of MPX clipping can cause noise floor elevation or presence of distortion components close to the pilot tone. This can cause loss of stereo reception. The protection filter clears the pilot frequency band before 19kHz tone insertion. Options are ON or OFF.

Clippers

Clipping is a very effective method of increasing the perceived loudness while keeping a controlled peak level and it won't produce any audible side effects if performed in moderation. Excessive clipping, however, will produce a form of distortion that is unpleasant to hear.

Our clippers have mechanisms in place to keep the distortion at bay but the trade-off is that some peaks may go through. This will depend on the selected preset and programme material.

Whilst the clippers configuration is preset dependent, we have exposed the most important controls to the user:

Audio clipper

Controls the audio clippers' drive from -6 to 6 dB. As you increase the drive you will obtain more loudness, at the expense of distortion.

Composite clipper

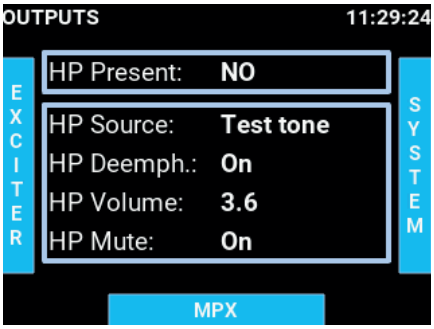
Composite clippers drive. These clippers act on the stereo encoded audio and its effect is very noticeable so the range is limited to -0.5 to 2dB. We recommend to use the audio clippers over the composite ones to generate the required amount of loudness, because composite clipping introduces stereo crosstalk.

WARNING

Depending on the music content, clipper drives over 0dB might increase the number of peaks over the modulation limit. A few occurrences is fine but if you are worried you can either turn the drive down a bit or play with the frequency deviation.

The outputs screen shows parameters for the relevant output configuration of the Cobalt Transmitter. This menu has two pages, Outputs and MPX.

Outputs



On the outputs page, you will first see the Headphone (HP) status.

HP Source

This selects between the source for the Headphones output. By default, this is set to Processor. The other options are Analogue or Digital audio.

Deemphasis

This allows you to apply deemphasis to the selected audio signal in case the audio signal to be monitored is pre-emphasized (from external audio processor for example). The parameters can be set to ON or OFF.

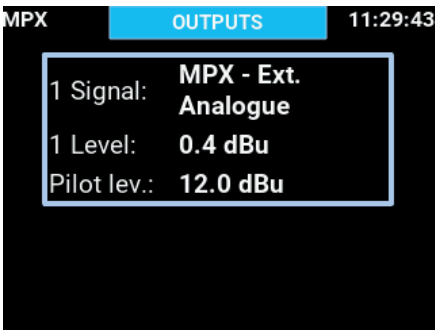
Headphone Volume

Adjust this to the desired Headphone output volume.

Headphone Mute

This will mute all output audio to the headphones and will override any set headphone volume level.

MPX outputs



Navigate down to MPX to access these settings. There are two physical analogue MPX outputs on Cobalt Transmitters. The output 1 has access to many MPX signals the output 2 is dedicated to the internally generated pilot, necessary for external RDS generation.

MPX Out Signal

This will set the source for MPX output 1.

MPX Out Level

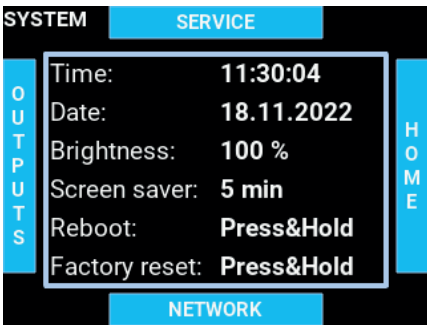
This sets the output signal level for MPX output 1 in dBu. The range is 0-12dBu with 0.1dB steps.

Pilot Out Level

This sets the output signal level for MPX output 2 in dBu. The range is 0-12dBu with 0.1dB steps.

The System screen shows parameters for the various settings relating to the Cobalt Transmitter. This menu has 2 pages, System, and Network.

System



On the System page, you will first see the following useful information.

Time

This adjusts the manual Time setting.

Date

This adjusts the manual Date setting.

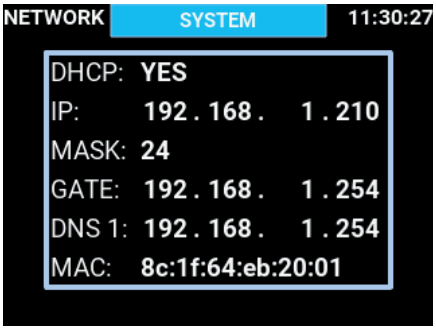
Brightness

This adjusts the screen and LED meters brightness, to your own level.

Screensaver

The screen saver has the following options, OFF, 1min, 5min, 15min, 30min

Network



The Network screen provides basic network settings, and also shows the current settings at a glance.

DHCP

Set DHCP to ON /OFF

IP

Set your desired IP address here. Use the Joystick to navigate and to enter in the details.

Mask

Set the Mask here. Use the Joystick to navigate and to enter in the details.

Gateway

Set your Gateway here. Use the Joystick to navigate and to enter in the details.

DNS 1

Set the DNS here. Use the Joystick to navigate and to enter in the details.

MAC

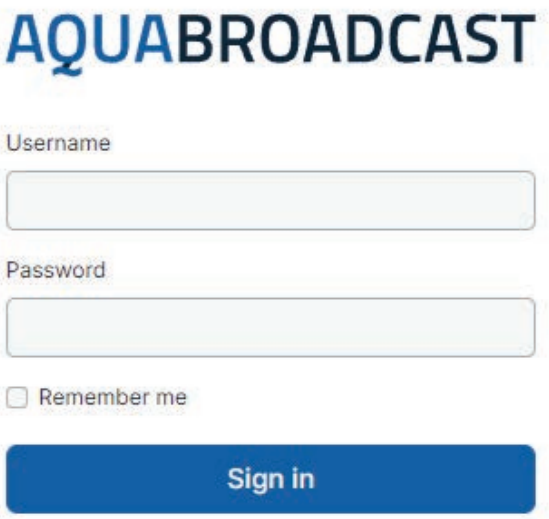
Set your MAC address here. Use the Joystick to navigate and to enter in the details.

All COBALT FM Transmitters feature a user-friendly Interface that is accessible from any web browser.

Please use the network screen on the front of the unit to determine or set the IP address and any other Network Parameters of the Cobalt Transmitter.

On any web browser, please enter the IP address of the unit, and press enter/search on the Browser bar.

You will then see the following screen, allowing you to enter in the default user credentials.



Please enter the username and password, and sign in.

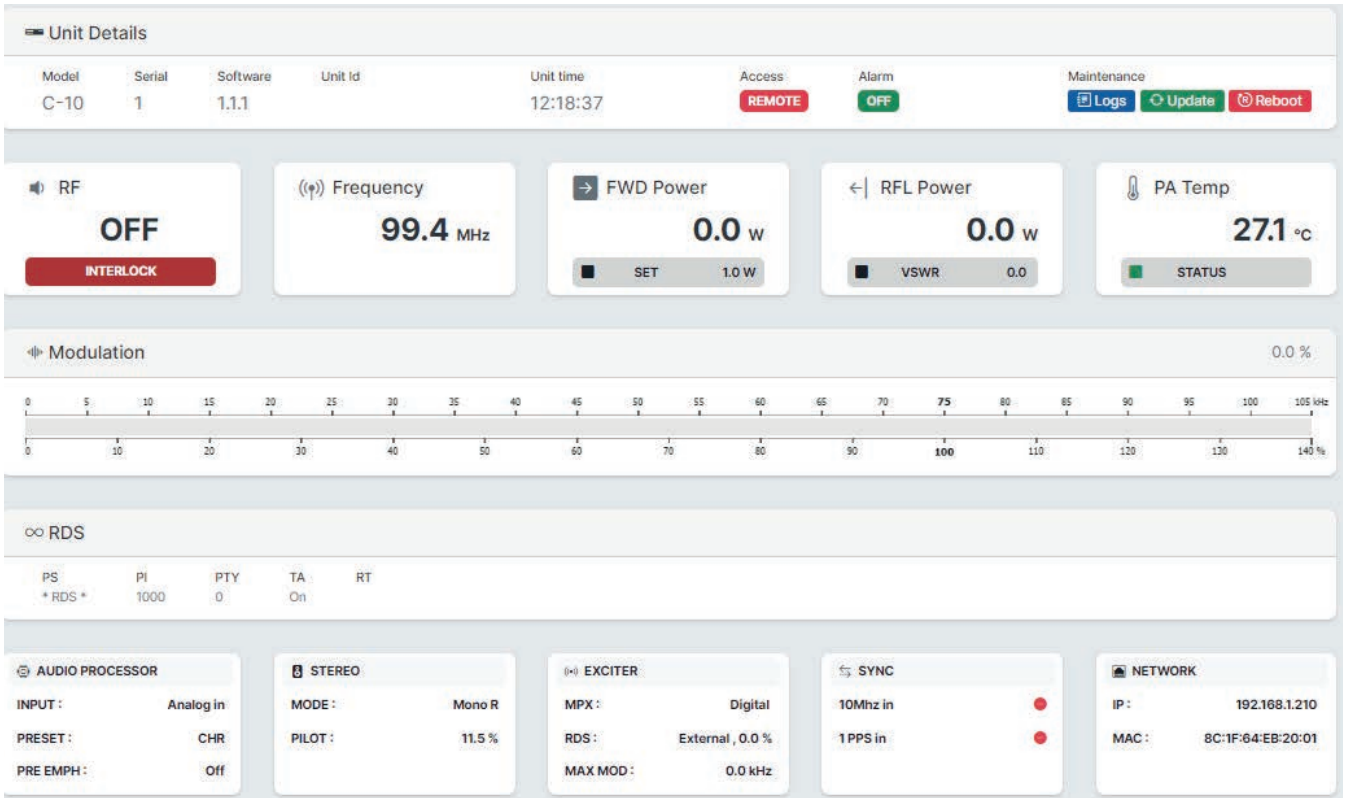
LOGIN DETAILS

The default user login credentials for all COBALT FM Transmitter products is

Username - admin
Password - pass

The main Dashboard is the default starting point of the Web Interface. From here , you can quickly see the most important information such as,

- **RF Status**
- **Frequency**
- **FWD Power**
- **REV Power**
- **Temperature**
- **Modulation**
- **Model**
- **Serial Number**
- **Status**
- **Software update**



Local Button

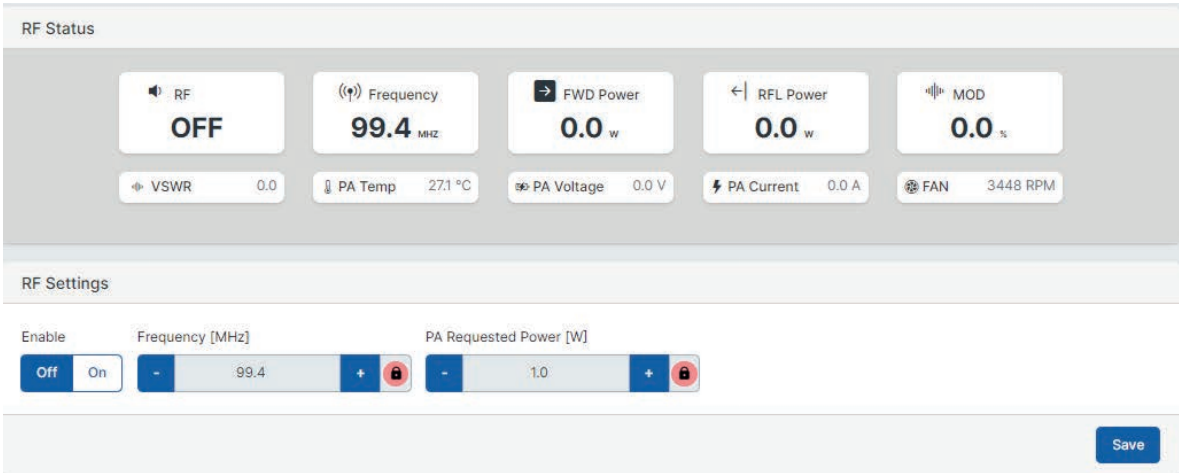
On the front panel, there is a button labelled LOCAL. This feature allows the user to lock-out any remote user from changing any Transmitter parameters, when connected and accessed remotely. In local mode (Push the LOCAL button to enable this mode) it is possible to control the transmitter from the Front panel Joystick and buttons/display. In remote mode, this transfers full control of the COBALT Transmitter from the web remote.

CAUTION

Please ensure that after using the Front panel controls (LOCAL Mode), you press the button to allow for full remote access to be available. If you do not do this you are not able to access the unit remotely, until you return to the site to enable the remote mode operation.

To adjust the Frequency, and PA requested Power, you need to click the **RED** padlock icon to unlock the editing mode, and then enter your desired value.

The lock stops you inadvertently making a change.



INPUTS SCREEN

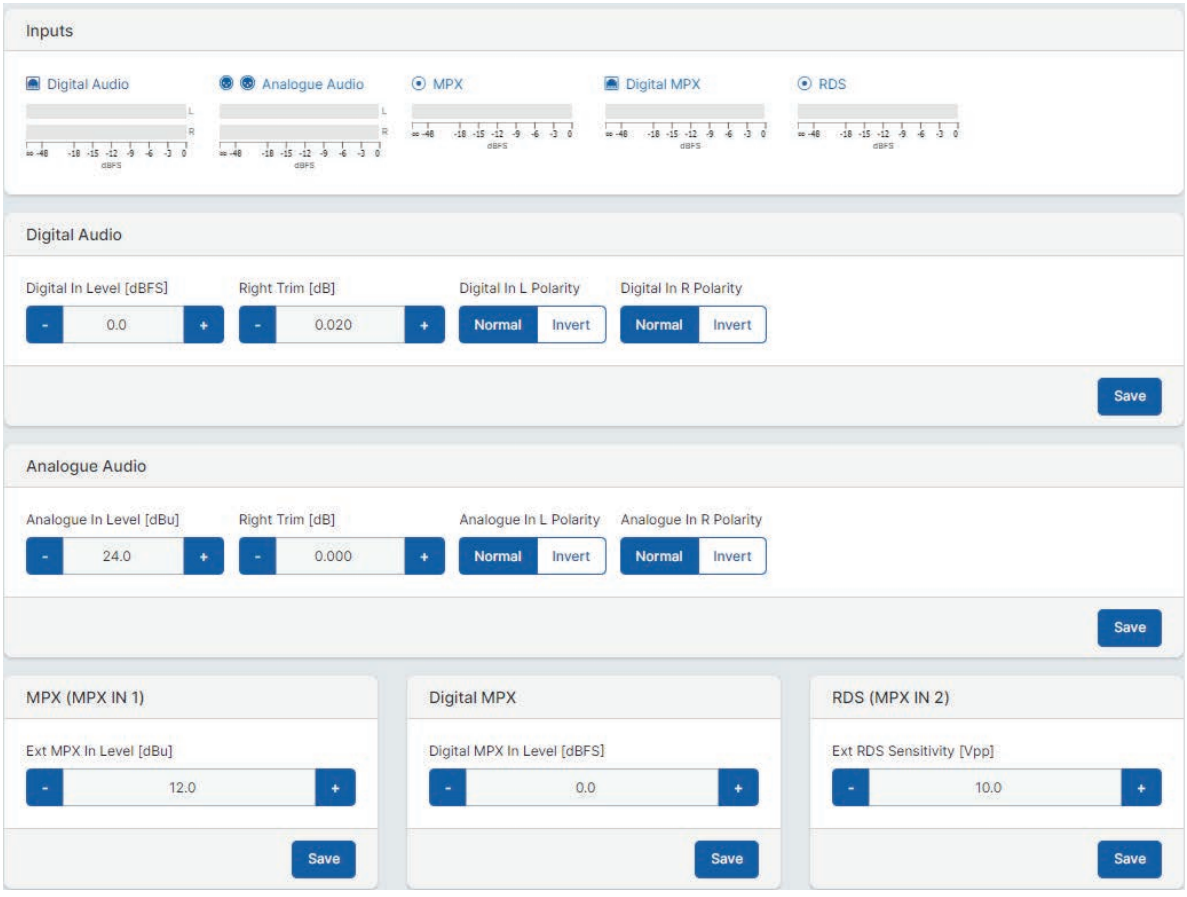
The COBALT allows you to use various inputs as your source.

Analogue Audio on XLR connectors

Dual MPX on BNC connectors

AES/EBU Digital Audio on RJ45 dongle (included)

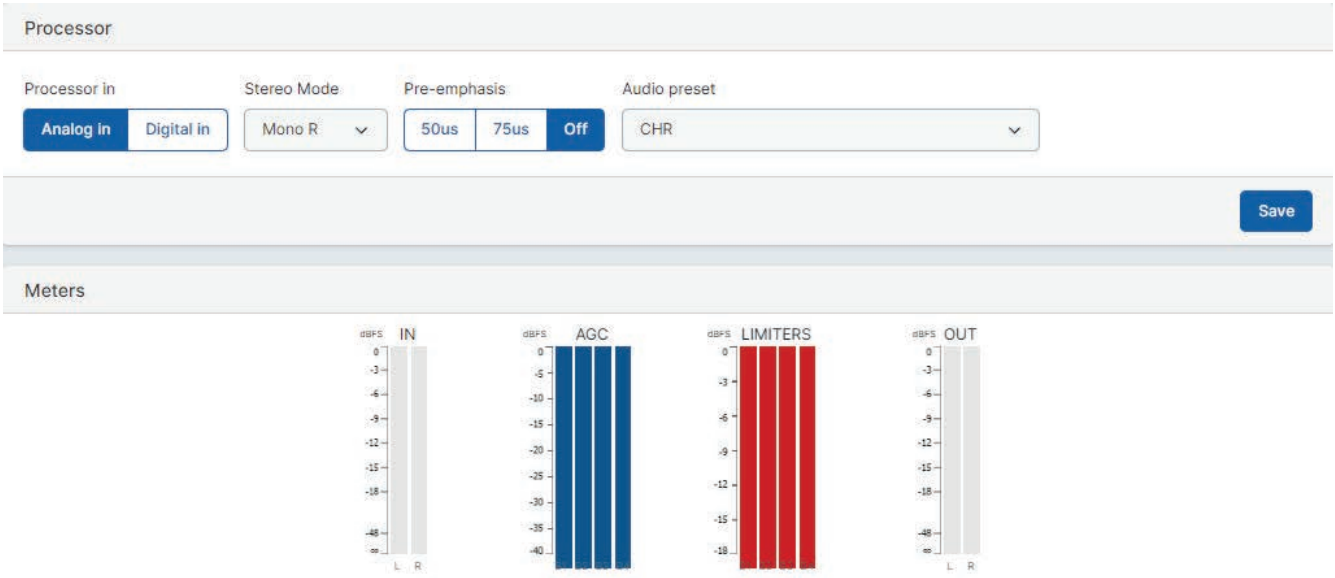
You can easily adjust any of the required input levels and view live input metering from the active inputs.



Every Cobalt FM Transmitter ships with a 4-band Audio Processor as standard.

With 21 individually designed presets to choose from, you will be able to choose a setting that suits you right from the start.

If you choose the “bypass” preset, you can still utilze the excellent Exciter features of the Transmitter, while using any other external Audio Processor you choose.



Select your Audio source, either Analog or Digital Audio input

Select your pre-emphasis (typically these are set to 75us in the USA, and 50us in Europe and many other countries)

The meters display the live audio and are low latency.

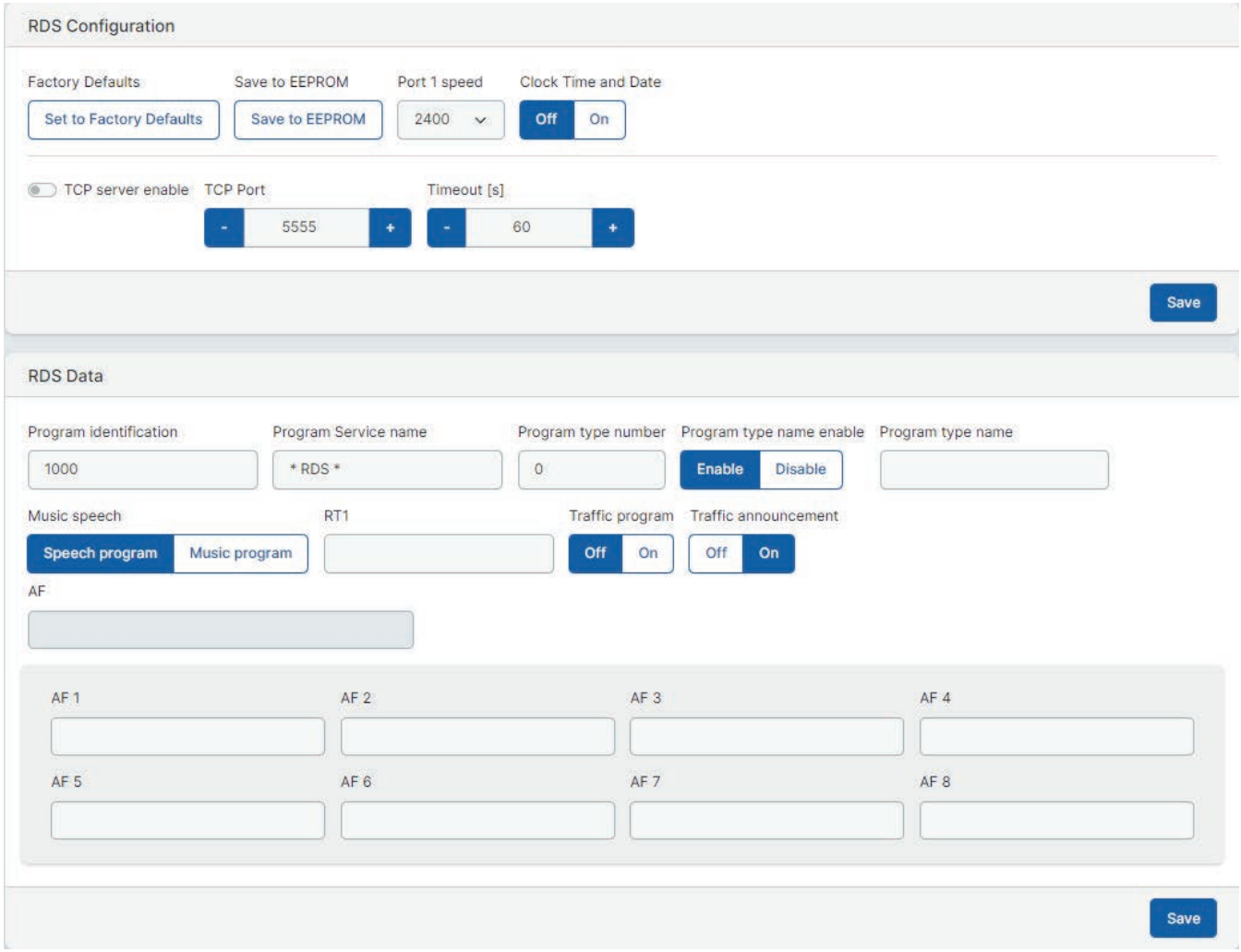
Always try the presets with your program music and experiment since sometimes the name can be misleading or not adapting well to some substyles. For example, metal music might be derived from rock but won’t benefit at all from the rock’n’roll preset; instead try CHR, tight or loud.

When comparing some preset candidates, bear in mind that their effect in the sound won’t be immediate due to the time constants in the audio processor. It is important to use music that you know well to be able to distinguish between changes in the sound due to production or to the audio processor. When possible, it is highly recommendable to assess the sound by listening to the received audio coming out from an MPX decoder or an FM receiver rather than from the unit’s headphone output.

If you are still in doubt, CHR works well in most situations.

Please refer to pages 16 & 17 for the complete list of the presets along with some useful descriptions of each preset.

The Cobalt incorporates an RDS encoder as standard. This feature allows full dynamic control of all RDS parameters, such as PI, PS and RT (Program Identifier, Program Service –station name, and Radio Text).



The internal RDS encoders' full set of features is only accessible via the web remote. This also includes UECP compliant parameters. To set the basic RDS settings from the front of the unit, use the joystick to navigate to the relevant section, and click to enter and adjust the setting. Once the setting is set, click enter again to set, then move to the next parameter and enter any further information as required.

PI (Program Identifier)

This is a 4-digit hexadecimal number (0-9, then A-F) which is unique to your station normally assigned to you by your local Broadcast regulator or licensing body. It will consist of numbers, an example would be 6C3D.

PS (programme service name)

PS is one of the obligatory settings in RDS. This is the text that will display on a compatible RDS enabled Tuner. It consists of up to 8 characters (spaces are included as a character)

PTY (programme type)

This determines pre-defined programme types (e.g., PTY1 News, PTY6 Drama, PTY11 Rock music) and allows users to find similar programming by genre.

M/S (Music/Speech)

Music/Speech is used to identify if music or speech program is transmitted. The signal supports tuner with two individual volume modes one for music, the other for speech.

TA (Traffic Announcement)

The Traffic Announcement Flag is used to indicate an ongoing traffic announcement. A tune can use the TA flag to Auto-switch to FM tuner if another audio source is selected (CD, etc.) and to automatically adjust audio volume to increase the audio source during a traffic announcement.

Dynamic RDS

The Cobalt's RDS encoder can be used in static mode, by setting the above parameters at installation.

Alternatively, the unit's RDS settings can be controlled dynamically, receiving data input from an external source such as a playout system or 3rd-party 'middleware' such as Magic RDS or RDS-Studio.

The RDS coder is UECP compliant (a standard protocol designed specifically to control RDS encoders) and can receive data via the LAN connection or UART USB port on the rear.

RDS Information

With RDS (RBDS in the US) , you can get listener's radios to display your station name or call-letters, up to 8 characters. This is what's entered in the 'PS' field. PS is one of the obligatory commands in RDS. One other is PI – an RDS encoder will not work without this.

PI means 'Program Identifier' and is a 4-digit hexadecimal number (0-9, then A-F) which is unique to your station certainly in your region if not in your country. This number is usually allocated by your country's regulatory authority, and will look something like 2E3F, for example. Please check with your regulator or look at you lisence paperwork to find out your unique PI code.

TP On

TP means 'this station sometimes broadcasts traffic information'. A lot of consumer car receivers will only stop a search on a station with this flag set ON. TA means 'this station is transmitting a traffic announcement now' and will cause radios to stop playing a CD and play the radio audio instead. Therefore, even if you don't carry traffic information, it's a good idea to have TP ON, but TA OFF unless you're carrying a traffic report right now.

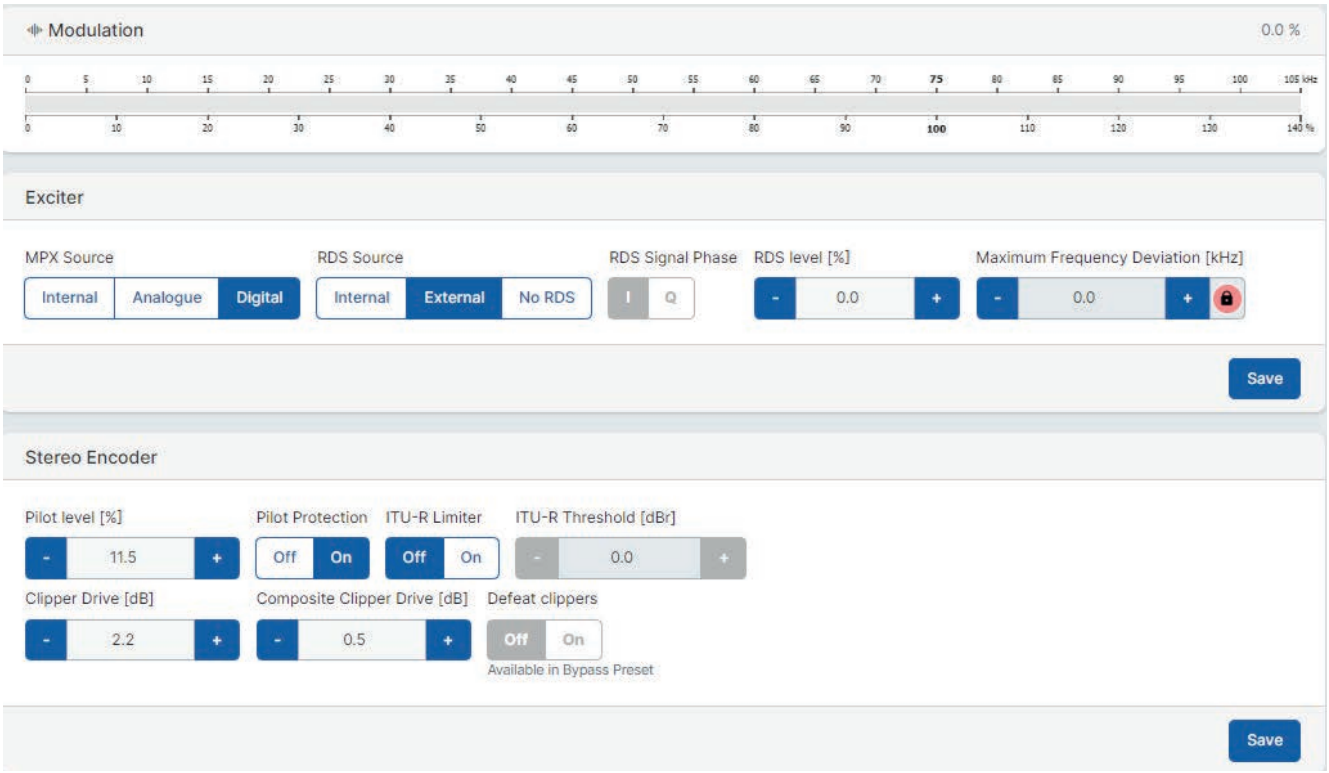
MS Flag	MUSIC (speech if you're a talk-only station)
PTY	Select whichever is closest to your format
PTYN	Leave empty
RT	This is where the Now Playing information appears if that data is being sent to the RDS encoder, or you can just enter other station information.
AF	Alternate frequency – this is a list of frequencies your station is also broadcasting on. If you have more than one transmitter, select the number of transmitters here and then fill in their frequencies in the boxes. All your transmitters should carry the same AF list – or at least those frequencies in neighbouring areas. If you have just one transmitter, leave this at zero.

Once these basic entries are made, you're good to go – except for one thing: You need to set the RDS sub-carrier level. There is no real standard for this, but it's good to start at 3.5kHz which is 5% - so in the MPX section, set RDS Level to 5%.

Bear in mind that whatever percentage of RDS you use is deviation that you can't use for program audio – there is really no point in running more than 6% RDS level.

Note that if you are feeding dynamic data to the Cobalt's RDS encoder, the entries on the front panel and the web remote will not show this data but will continue to show the static data you've programmed in manually

This screen will at a glance give you a visual indication of the Modulation present.



Exciter

On the Exciter section, you will see the following options;

MPX Source — This selects between the internally generated MPX (from the Stereo generator with processed audio with or without RDS), external analogue MPX input or external digital MPX input.

RDS Source — This sets between internal (built-in RDS) or external (for any third-party RDS encoder)

Max Frequency deviation — This is used to see the MPX signal level. In most countries, this should be at 100%=75kHz. (To adjust this please first click the Unlock icon and enter the value)

Stereo Encoder

The Stereo encoder comprises the MPX signal from audio channels, pilot and RDS signal. It automatically keeps the overall modulation within the 100% modulation limit.

Pilot level — Sets the level of 19kHz pilot tone, which is required for stereo synchronization. The range is 0 to 15% with 0.1% steps.

Pilot Protection — Enables or disables a notch filter in the MPX signal for clean pilot insertion. Excessive amount of MPX clipping can cause noise floor elevation or presence of distortion components close to the pilot tone. This can cause loss of stereo

ITU-R Limiter — Enables or disables the ITU-R limiter which is a requirement in certain countries.

ITU-R Threshold (dBr) — This adjusts the threshold and is adjustable from -6 to +12 dBr

Clipper Drive (dB) — This adjusts the threshold and is adjustable form -6 to +6dB

Clippers

Clipping is a very effective method of increasing the perceived loudness while keeping a controlled peak level and it won't produce any audible side effects if performed in moderation. Excessive clipping however, will produce a form of distortion that is unpleasant to hear. Our clippers have mechanisms in place to keep the distortion at bay, but the trade-off is that some peaks may go through. This will depend on the selected preset and programme material.

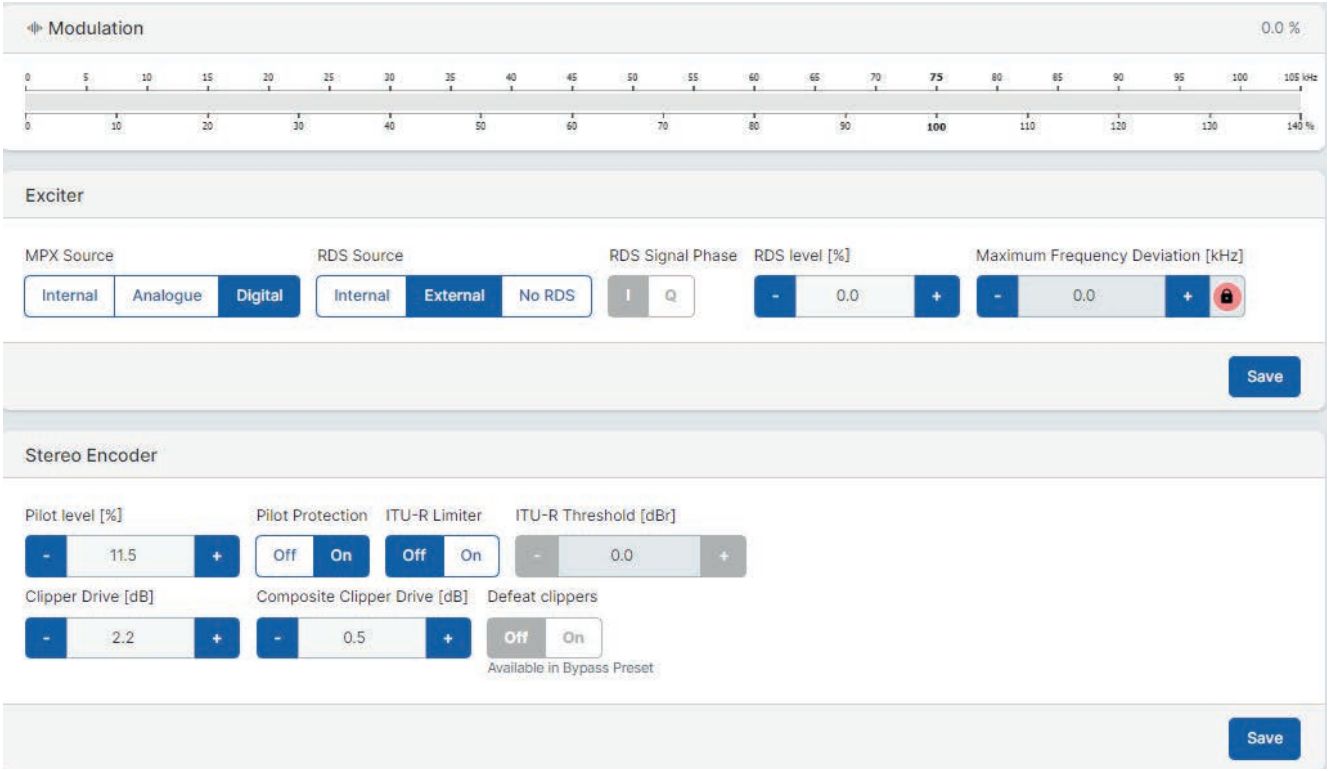
Whilst the clippers configuration is preset dependent, we have exposed the most important controls to the user.

Audio clipper

Controls the audio clippers' drive from -6 to 6 dB. As you increase the drive you will obtain more loudness, at the expense of distortion.

Composite clipper

Composite clippers drive. These clippers act on the stereo encoded audio and its effect is very noticeable so the range is limited to -0.5 to 2dB. We recommend to use the audio clippers over the composite ones to generate the required amount of loudness, because composite clipping introduces stereo crosstalk.



CAUTION

Depending on the music content, clipper drives over 0dB might increase the number of peaks over the modulation limit. A few occurrences are fine but if you are worried you can either turn the drive down a bit or play with the frequency deviation.

Outputs

On the outputs page, you will first see the Headphone (HP) status.

HP Source This selects between the source for the Headphones output. By default, this is set to Processor. The other options are Analogue or Digital audio.

Deemphasis This allows you to apply deemphasis to the selected audio signal in case the audio signal to be monitored is pre-emphasized (from external audio processor for example). The parameters can be set to ON or OFF.

Headphone Volume Adjust this to the desired Headphone output volume.

Headphone Mute This will mute all output audio to the headphones and will override any set headphone volume level.

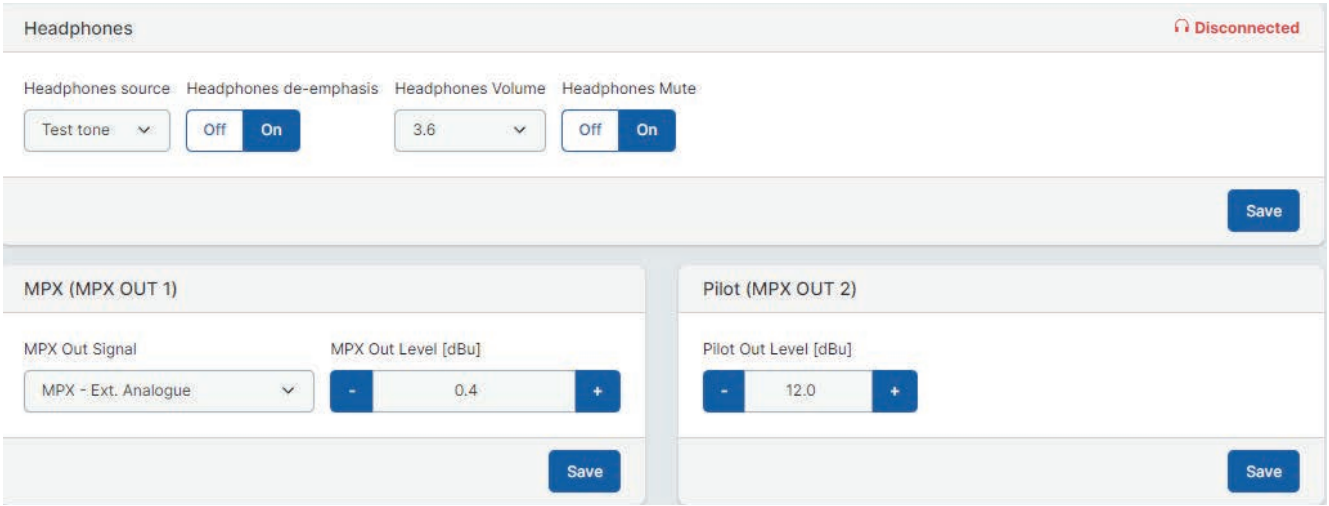
MPX Outputs

Navigate down to MPX to access these settings. There are two physical analogue MPX outputs on Cobalt Transmitters. The output 1 has access to many MPX signals the output 2 is dedicated to the internally generated pilot, necessary for external RDS generation.

MPX Out Signal This will set the source for MPX output 1.

MPX Out Level This sets the output signal level for MPX output 1 in dBu. The range is 0-12dBu with 0.1dB steps.

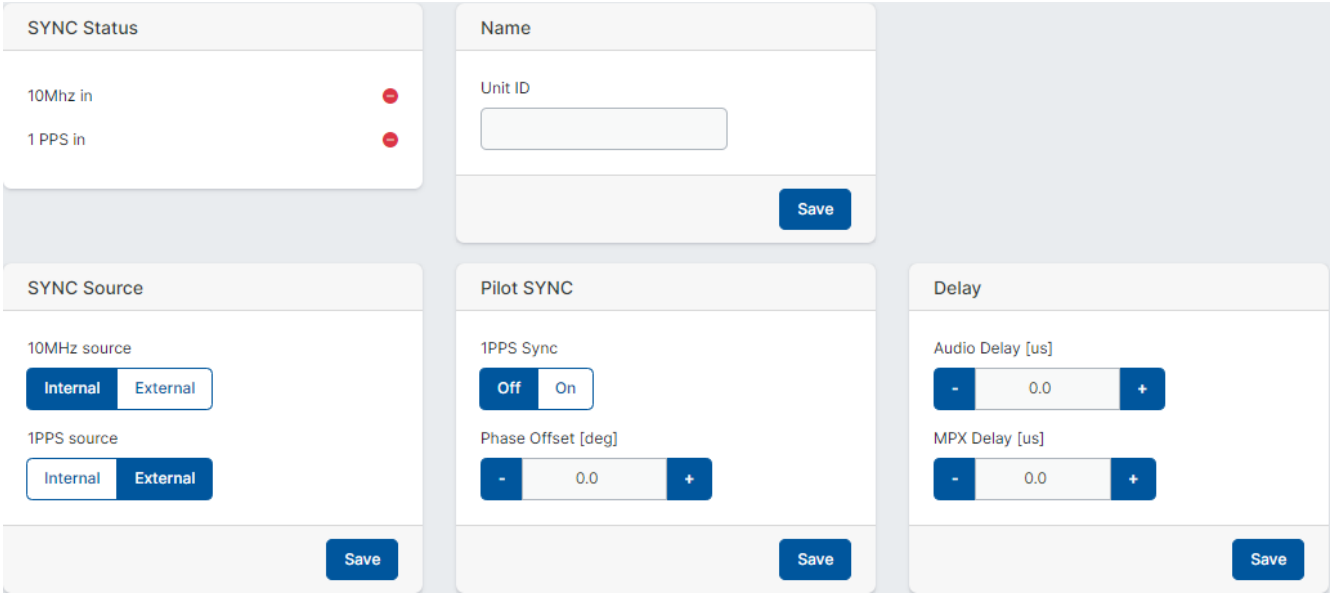
Pilot Out Level This sets the output signal level for MPX output 2 in dBu. The range is 0-12dBu with 0.1dB steps.



The SFN (Single Frequency Network) screen lets you enter and adjust parameters to sync Cobalt Transmitters.

You will need to have an external GPS receiver that has both 10MHz and 1PPS sync outputs to connect to the appropriate BNC connectors on the back of the Cobalt. These need to be set to External on the SYNC Source when using the external GPS receiver.

A future option on Cobalt Transmitters will be an Internal GPS card which is an optional extra, in this case the settings should be set to internal.



The Sync status lights will be **GREEN** when a valid sync from the GPS is obtained.

Ideally, its best to setup the sync using a suitable spectrum analyser, and to align the signals. You will still need to make some adjustments to the delay, and each system will need specific attention in getting the sync and delay correct. Field testing and listening will work hand in hand with any adjustments you make.

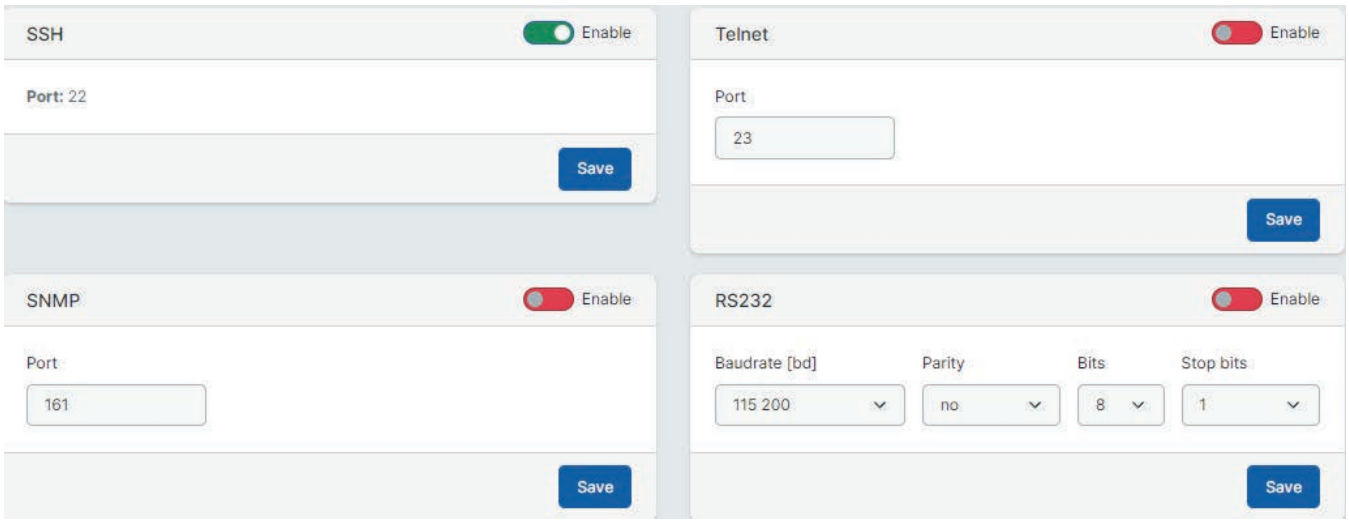
Please contact us for more information or any specific questions regarding the implementation or planning of your SFN Network.

The system screen has 3 sections.

Services

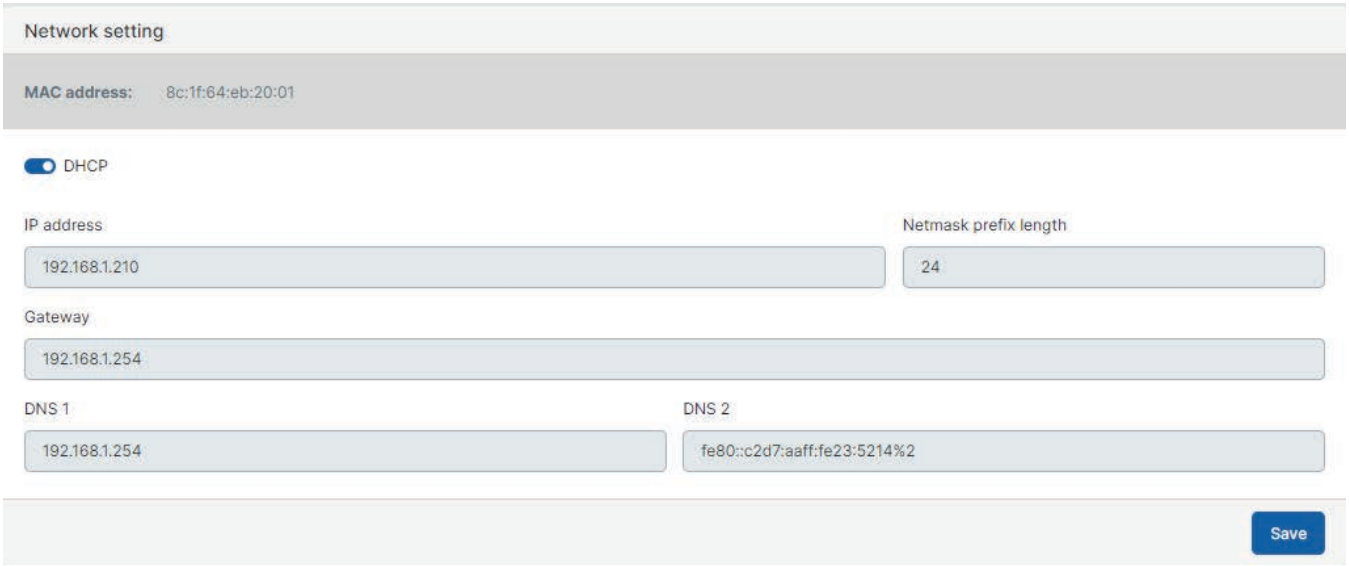
Here you can enable and set various additional services like SNMP, Telnet and RS232.

After enabling and/or changing a parameter, please make sure you save each relevant section before proceeding to the next section.



Network

You can adjust these parameters to suit your own network requirements, this can also be done from the front panel controls.



LOGS

System logs can be accessed here.

Each relevant log will be sorted by the most recent timestamp.

Clicking “SHOW” will open up further information showing the log including any errors.

You can also download the log and save to your Computer for futher reference, archiving, or to share the log with our support department.

NOTICE

The logs Timestamp will only be accurate when the Cobalt Transmitter is connected to a network with access to NTP Time servers on the Internet.

COBALT C-30

Output Power	30
Range (W)	5-30W
RF Output connector	N-Type (Female)
Input ACV @ 50/60Hz	100-240V
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Consumption	~ 101W @ max power
Dimensions WxDxH (inches)	19x15x1RU (1.75”)
Dimensions WxDxH (cm)	48.3 x 38 x 4.45
Weight	3.7Kg / 8.14lb

COBALT C-50

Output Power	50
Range (W)	5-50W
RF Output connector	N-Type (Female)
Input ACV @ 50/60Hz	100-240V
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Consumption	~125W @ max power
Dimensions WxDxH (inches)	19x15x1RU (1.75”)
Dimensions WxDxH (cm)	48.3 x 38 x 4.45
Weight	3.7Kg / 8.14lb

COBALT C-100

Output Power	100
Range (W)	5-100W
RF Output connector	N-Type (Female)
Input ACV @ 50/60Hz	100-240V
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Consumption	~177W @ max power
Dimensions WxDxH (inches)	19 x 15 x 1RU (1.75”)
Dimensions WxDxH (cm)	48.3 x 38 x 4.45
Weight	3.7Kg / 8.14lb

COBALT C-300

Output Power	300
Range (W)	50-300W
RF Output connector	7/16 DIN (Female)
Input ACV @ 50/60Hz	100-240V
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Supplies	1 (2nd is optional)
Dimensions WxDxH (inches)	19 x 18 x 2RU (3.5”)
Dimensions WxDxH (cm)	48.2 x 45.7 x 8.8
Weight	7.2kg / 15.87lb

COBALT C-600

Output Power	600
Range (W)	200-600W
RF Output connector	7/16 DIN (Female)
Input ACV @ 50/60Hz	100-240V
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Supplies	1 (2nd is optional)
Dimensions WxDxH (inches)	19 x 18 x 2RU (3.5”)
Dimensions WxDxH (cm)	48.2 x 45.7 x 8.8
Weight	7.2kg / 15.87lb

COBALT C-1000

Output Power	1000
Range (W)	200-1000W
RF Output connector	7/16 DIN (Female)
Input ACV @ 50/60Hz	100-240V*
Power Connector	IEC 13A
DC Input (optional)	48V DC
Power Supplies	1 (2nd is optional)
Dimensions WxDxH (inches)	19 x 18 x 2RU (3.5”)
Dimensions WxDxH (cm)	48.2 x 45.7 x 8.8
Weight	7.2kg / 15.87lb

NOTE
For the C-1000 to be used on 120VAC, you must have the optional 2nd Power supply installed. Without this the units will only work on 220VAC.

COMMON SPECIFICATIONS ACROSS ALL COBALT MODELS

MODULATOR

Transmitter type	Solid-state FM Stereo transmitter
Modulator	Direct-to-channel (DDS)
RF Output Frequency Range	VHF Band II, 88-108MHz
RF Frequency Steps	100kHz
Frequency Stability	±1 ppm or ±150Hz range with internal 10MHz clock reference
FM Modulation Range Capability	75kHz default, 100% modulation user adjustable up to 105kHz 140%, maximum 300kHz

RF

Power Stability	≤ ± 0.25dB
Asynchronous/AM noise	≤ -60dB
Synchronous AM s/n ratio	≤ -60dB
RF Harmonic and Spurious Suppression	Meets ETSI requirements
VSWR operation	Fully protected against gradual or sudden VSWR condition Proportional power reduction from VSWR 1.5:1

STEREO ENCODER

Performance	400Hz/1kHz test tones at modulation level ≤75kHz
Modes	Stereo, Mono L+R, Mono L, Mono R
Frequency response	20Hz-15kHz ±0.02dB
Pre-emphasis	0, 50 or 75µs
Pilot tone	19kHz, adjustable level 0-12%
Subcarriers suppression	≤ -70dB
Stereo separation	≥75dB AES/EBU input ≥70dB Analogue input
Stereo SNR	≥80dB with 75us de-emphasis ≥75dB without de-emphasis on both inputs
Stereo THD+N	<0.03%
Crosstalk	≥70dB, between L+R and L-R due to channel matching, both inputs

MONO PERFORMANCE

Frequency response	20Hz - 15kHz ±0.02dB
Pre-emphasis	0, 50 or 75 µs
Mono SNR	≥100dB, with 75us de-emphasis
Mono THD+N	≤0.002% analogue input, ≤0.001% AES input, with 75us de-emphasis

ANALOGUE AUDIO PERFORMANCE

Frequency response	10Hz-53kHz ±0.03dB 53kHz-70kHz ±0.3dB
FM SNR	≥90dB, with 75us de-emphasis
THD+N	≤0.003% with 75us de-emphasis

DIGITAL MPX INPUT PERFORMANCE

Frequency response	0-90kHz ±0.005dB
FM SNR	≥100dB, with 75us de-emphasis
THD+N	≤0.001% with 75us de-emphasis

AUDIO INPUTS

Analogue	2 x XLR female, 10kΩ impedance level adjustable 0-24dBu
Digital	AES/EBU via RJ45 per StudioHUB+ Level adjustable -20 0dBFS sampling rates 32-192kHz

AUDIO OUTPUT

Headphones Out	1/4" (6.3mm) female stereo socket, software adjustable volume minimum load impedance 16Ω

WIDEBAND INPUTS

Analogue MPX	BNC, 10kΩ impedance, level adjustable 0-12dBu
Digital MPX	AES/EBU via RJ45 per StudioHUB+ level -20-0dBFS, sampling rate 192kHz left channel
Analogue RDS	BNC, 10kΩ impedance, level adjustable from 0.1-10Vpp

WIDEBAND OUTPUTS

Analogue MPX	BNC, 10Ω impedance, level adjustable 0-12dBu
Analogue Pilot	BNC, 10Ω impedance, level adjustable 0-12dBu

RDS GENERATOR

Type	Fully Dynamic RDS/RDS2/RBDS Generator
Protocols	ASCII commands, UECP protocol and X-Command Multi-port
Ports	UART over USB-B & Ethernet

WIDEBAND INPUTS

10MHz input	BNC, 50Ω terminated
1PPS input	BNC, 50Ω terminated
RF sample output	SMA, 50Ω, -30dBc
UART over USB	USB-B, system control
USB	2 x USB-A, storage & FW upgrade
Ethernet	1 x RJ45
RS232	DB25 shared connector, system control
Interlock/ External RF Off	GPIO DB25 shared connector, 8 x output & 8 x input, all optically isolated DB25 shared connector,programmable logic/polarity
Analogue voltage output	DB25 shared connector 4-channel 0-5V range

ENVIRONMENTAL

Altitude	15,000 ft / 4,420m AMSL
Temperature range	0 to +45°C working. -10 to +50°C storage
Humidity	95% @ 35°C, non-condensing

If you need and advice or support, we are always on hand to help you as fast as we can.

We have various ways that you can contact us, and we always recommend any additional information is sent to us so we can quickly assist you.

Aqua Broadcast Limited
Unit 7, First Quarter
Blenheim Road
Epsom
KT19 9QN
United Kingdom

+44 203 411 0387
info@aquabroadcast.co.uk

Firmware updates

Please visit https://www.aquabroadcast.co.uk/support then simply click on the Downloads tab and select the latest firmware version available.

Alternatively, please scan the QR code below to link directly to the downloads section.

FCC Statement
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.
This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

FCC Radiation Exposure Statement for COBALT300:
This equipment complies with FCC radiation exposure limits set forth for an occupational/controlled environment .This equipment should be installed and operated with minimum distance 200cm between the radiator& your body.

Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates,uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

ISED RSS Warning/ISED RF Exposure Statement
ISED RSS Warning:
This device complies with Innovation, Science and Economic Development Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference.

Le présent appareil est conforme aux CNR d'ISED applicables aux appareils radio exempts de licence.L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage.

ISED RF exposure statement for COBALT300:
This equipment complies with ISED radiation exposure limits set forth for an occupational/ controlled environment. This equipment should be installed and operated with minimum distance 200cm between the radiator& your body.This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
Le rayonnement de la classe b repecte ISED fixaient un environnement nprofessionnels / contrôlés.Installation et mise en œuvre de ce matériel devrait avec échangeur distance minimale entre 200cm ton corps.Lanceurs ou ne peuvent pas coexister cette antenne ou capteurs avec d'autres.